

ISMP List of High-Alert Medications in Acute Care Settings

High-alert medications are drugs that bear a heightened risk of causing significant patient harm when they are used in error. Although mistakes may or may not be more common with these drugs, the consequences of an error are clearly more devastating to patients. We hope you will use this list to determine which medications require special safeguards to reduce the risk of errors. This may include strategies such as standardizing the ordering, storage, preparation, and administration of these products; improving access to information about these drugs; limiting access to high-alert medications; using auxiliary labels; employing clinical decision support and automated alerts; and using redundancies such as automated or independent double checks when necessary. (Note: manual independent double checks are not always the optimal error-reduction strategy and may not be practical for all of the medications on the list.)



Classes/Categories of Medications

adrenergic agonists, IV (e.g., **EPINEPH**rine, phenylephrine, norepinephrine)

adrenergic antagonists, IV (e.g., propranolol, metoprolol, labetalol)

anesthetic agents, general, inhaled and IV (e.g., propofol, ketamine)

antiarrhythmics, IV (e.g., lidocaine, amiodarone)

antithrombotic agents, including:

- anticoagulants (e.g., warfarin, low molecular weight heparin, unfractionated heparin)
- direct oral anticoagulants and factor Xa inhibitors (e.g., dabigatran, rivaroxaban, apixaban, edoxaban, betrixaban, fondaparinux)
- direct thrombin inhibitors (e.g., argatroban, bivalirudin, dabigatran)
- glycoprotein IIb/IIIa inhibitors (e.g., eptifibatide)
- thrombolytics (e.g., alteplase, reteplase, tenecteplase)

cardioplegic solutions

chemotherapeutic agents, parenteral and oral

dextrose, hypertonic, 20% or greater

dialysis solutions, peritoneal and hemodialysis

epidural and intrathecal medications

inotropic medications, IV (e.g., digoxin, milrinone)

insulin, subcutaneous and IV

liposomal forms of drugs (e.g., liposomal amphotericin B) and conventional counterparts (e.g., amphotericin B desoxycholate)

moderate sedation agents, IV (e.g., dexmedetomidine, midazolam, **LOR**azepam)

moderate and minimal sedation agents, oral, for children (e.g., chloral hydrate, midazolam, ketamine [using the parenteral form])

opioids, including:

- IV
- oral (including liquid concentrates, immediate- and sustained-release formulations)
- transdermal

neuromuscular blocking agents (e.g., succinylcholine, rocuronium, vecuronium)

parenteral nutrition preparations

sodium chloride for injection, hypertonic, greater than 0.9% concentration

sterile water for injection, inhalation and irrigation (excluding pour bottles) in containers of 100 mL or more

sulfonylurea hypoglycemics, oral (e.g., chlorpro**PAMIDE**, glimepiride, gly**BURIDE**, glipi**ZIDE**, **TOLBUT**amide)

Specific Medications

EPINEPHrine, IM, subcutaneous

epoprostenol (e.g., Flolan), IV

insulin U-500 (special emphasis*)

magnesium sulfate injection

methotrexate, oral, nononcologic use

nitroprusside sodium for injection

opium tincture

oxytocin, IV

potassium chloride for injection concentrate

potassium phosphates injection

promethazine injection

vasopressin, IV and intraosseous

**All forms of insulin, subcutaneous and IV, are considered a class of high-alert medications. Insulin U-500 has been singled out for special emphasis to bring attention to the need for distinct strategies to prevent the types of errors that occur with this concentrated form of insulin.*

Background

Based on error reports submitted to the ISMP National Medication Errors Reporting Program (ISMP MERP), reports of harmful errors in the literature, studies that identify the drugs most often involved in harmful errors, and input from practitioners and safety experts, ISMP created and periodically updates a list of potential high-alert medications. During June and July 2018, practitioners responded to an ISMP survey designed to identify which medications were most frequently considered high-alert medications. Further, to assure relevance and completeness, the clinical staff at ISMP and members of the ISMP advisory board were asked to review the potential list. This list of medications and medication categories reflects the collective thinking of all who provided input.

Abbreviation definitions: IV—intravenous IM—intramuscular